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Imagery analysis report

SLBM Land-Based Test Activity, Wuzhai Missile Test Complex, China (S)

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SLBM LAND-BASED TEST ACTIVITY, WUZHAI MISSILE TEST COMPLEX, CHINA (S)**ABSTRACT**

1. (S/D) Submarine-launched ballistic missile (SLBM) land-based missile testing continued at the Wuzhai Missile Test Complex [] during the period [] This solid-propellant missile has been given the NPIC interim designation Wuzhai-I (WZ-I). The land-based test program at the complex consists of at least four observable phases: launch tube ejection tests, surface erection tests, surface launch tests, and silo launch tests. Launch tube ejection testing was completed during the period [] Surface erection tests were conducted during the period [] Surface launch testing will probably begin in the near future. Possible preparations for silo launch tests have been observed. Each phase of the SLBM test program appeared to be critical to conducting the next phase of testing; however, there was considerable overlap in the presence of the indicators for each test phase.

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INTRODUCTION

2. (TSR) The Chinese SLBM program has been under development, as observed on imagery, since the mid-to-late 1960s at a wide range of installations (Figure 1). The SLBM program has probably been composed of six major activities: system design and development, launch tube testing, rocket motor testing and production, land-based testing of the missile, at-sea missile and launch tube testing, and probable production of a nuclear ballistic missile submarine (SSBN). System design and development probably took place at the Jinxi Naval Weapons Research/Design/Training Complex SSM [] during the late 1960s.¹ Launch tube pop-up/ejection testing was conducted in the Lushun/Xiaopingdao area on the south coast of the Liaodong Peninsula. This testing utilized a pop-up test stand and the Golf-class ballistic missile submarine (SSB) operating from the Xiaopingdao Submarine Base []² Rocket motor design, testing, and series production for the SLBM are taking place at the Hohhot Solid Propellant Complex [] Land-based testing of the SLBM system, the subject of this report, is currently underway at the Wuzhai Missile Test Complex. At-sea testing will probably take place using the Golf-class SSB in the Bohai Strait/Northern Yellow Sea area.^{4,5} Construction of an SSBN is now underway at the Huludao Naval Base and Shipyard []

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**FIGURE 1. SLBM-RELATED INSTALLATIONS IN CHINA**

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LAND-BASED MISSILE TESTING

3. (S/D) The land-based missile testing portion of the Chinese SLBM test program, currently under way at the Wuzhai Missile Test Center, consists of at least four observable phases:

- An ejection test phase, to insure that the launch tube and the ejection device were capable of ejecting the full weight of the missile without damage.
- A surface erection phase, to insure that the missile and all of the launch-related equipment were compatible and capable of supporting surface launches.
- A surface launch test phase, to confirm that the missile is capable of achieving ignition, thrust, and guidance goals, and possibly to test the solid-propellant missile in a mobile land-based role.
- A silo test phase, to test the procedures and equipment required for a successful launch from either a submarine or a silo.

The ejection test phase has been completed. The surface erection phase was probably in a very late stage, if not completed. The surface launch phase will probably begin in the near future. Early possible preparations for the silo launch phase have been observed. The missile/missile simulator has been given the NPIC interim designator Wuzhai 1 (WZ-1) for ease of identification.

Ejection Test Phase

4. (S/D) The ejection test phase began on [] and appeared to have been completed by [] at Wuzhai SSM Research/Development/Training Launch Site A1/A2/A3 []. This phase was made up of one possible and two confirmed ejection tests from the A2 silo-like test position. The ejection test dummies (ETD) used to conduct this phase of the test program probably simulated the weight and diameter of the missile to test the launch tube ejection subsystems. The subsystems being tested probably included the gas generator that ejected the missile and the launch tube that supported and guided the missile prior to and during ejection. The stability imparted to the ETD during and immediately following the ejection sequence was successfully tested. The two confirmed tests successfully ejected an ETD approximately 35 meters west-southwest of the A2 silo-like test position (Figures 2 and 3). This indicated that the tests were successful and that the next test phase was ready to begin.

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Surface Erection Test Phase

5. (S/D) The surface erection test phase probably included the arrival and checkout of the WZ-1 and support equipment, testing of the compatibility of the launch-related equipment with the WZ-1 and missile canister, verification of erection procedures, and training personnel for the first surface launches. This test phase began on [] and was probably nearing completion on []

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Equipment Arrival

6. (TSR) SLBM surface launch related equipment began arriving at the complex on [] and most of the equipment had arrived by [] an SLBM canister transporter (Figures 4 and 5) was in the Wuzhai SSM Support Facility []. This canister transporter has been previously identified as the SLBM transporter, or as the "Bedsprings" transporter. Also on [] a short range ballistic missile (SRBM) transporter/erector (T/E) was observed in the support facility CSS-2 assembly and checkout area (Figure 6). Two SRBM T/E were observed in the support facility on []. The use of existing and possibly surplus SRBM equipment, rather than designing a unique new piece of equipment, may have been an attempt to reduce development time and expenditures. The SRBM T/E was modified by the addition of two service platforms on the bed of the T/E for SLBM service support (Figure 7). The service platforms apparently fold flat against the body of the T/E when not in use. A missile canister was first observed at the complex in the support facility on [] (Figure 8). The canister was probably draped with canvas and placed horizontally on a probable rail-type dolly in front of a CSS-X-4 assembly and checkout building in the support facility. The canister probably contained a WZ-1 that had been undergoing checkout in the building prior to beginning erection testing. Whether the WZ-1 within the canister was a missile or a missile simulator could not be determined definitively from imagery. By [] all of the equipment for erection testing, except the launch stand, was observed at the complex. Compatibility testing of the various pieces of SLBM equipment probably began upon the arrival of the equipment and continued during the erection tests.

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First Probable Erection Test

7. (TSR) On [] the first erection test was observed at the launch site A1 pad (Figure 9). SLBM equipment was on the launch pad and included an open canister, a WZ-1, a canister transporter, a launch stand, an SRBM T/E, and two truck-mounted cranes. No payload was observed. The SLBM canister had probably been brought to the launch site on the canister transporter. The canister had been removed from the transporter, probably by a large truck-mounted crane, and was placed horizontally on the pad. The canister had been opened into two sections along the longitudinal axis (Figure 10). Internal

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support points in the canister indicated that the WZ-1 first and second stages were being transported in a mated configuration. The WZ-1 was lying horizontal on the apron (Figure 11), after having apparently been removed from the canister by the large truck-mounted crane. The size and shape of the WZ-1 indicated that the first and second stages of the missile were mated and that the WZ-1 was draped with light-toned canvas. The large truck-mounted crane was subsequently observed at all missile-handling operations. The WZ-1 was being supported on the apron by two supports/cradles. The size and shape of the WZ-1 indicated that only the first and second stages were present. The canvas-covered SRBM T/E was aligned with the launch stand on the A1 launch pad but not parked in the missile support position at the center of the launch pad. This was the first observation of the launch stand for the SLBM (Figure 12). The SLBM launch stand consisted of a square table, mounted on four support legs, with a missile support ring mounted above the table. A single probable flame-splitter was centered below the missile support ring. Two possible support arms/umbilical towers were attached to the sides of the launch stand. On [redacted] only the SRBM T/E remained on the A1 launch pad. An erection test probably occurred between [redacted]

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Second Erection Test

8. (S/D) The second WZ-1 erection test was observed at A1 launch pad on [redacted] (Figure 13). The WZ-1 was erected on the launch stand for the first time; however, the SRBM T/E obscured most of the missile. The two support/service platforms on the erected bed of the SRBM T/E encircled the missile, one near the top of the second stage and one near the middle of the first stage. Possible canvas/netting appeared to be stretched vertically between the two service platform levels, probably as a sight-screen from ground observation. The SLBM canister was again lying open on the apron. The large truck-mounted crane was positioned between the open canister and the erected WZ-1, suggesting that the crane had directly lifted the WZ-1 into position on the launch stand. Although the T/E obscured most of the WZ-1, analysis of the shadow cast by the combined missile and T/E indicated that a payload was probably not mounted above the second stage. On [redacted] the SLBM equipment, except for the launch stand, had been removed from the A1 pad.

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Third Erection Test

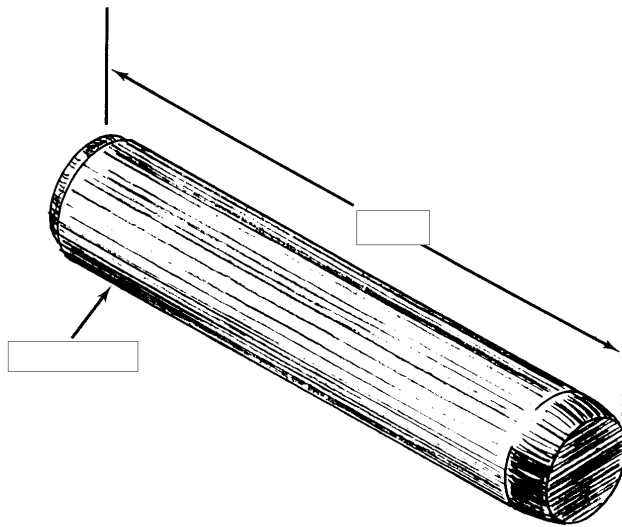
9. (S/D) On [redacted] a full complement of SLBM equipment had again returned to the A1 launch pad. The SLBM canister had been removed from the SLBM canister transporter; however, the WZ-1 had not yet been removed from the canister. On [redacted] the WZ-1 was removed from the canister and erected on the launch stand (Figure 14). The bed of the SRBM T/E was erected in the missile support

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FIGURE 3. DRAWING OF EJECTION TEST DUMMY

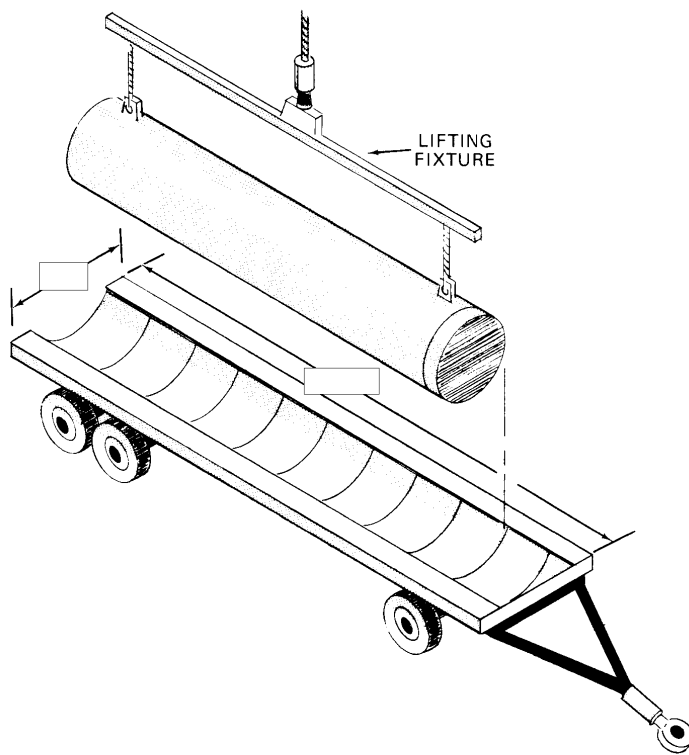
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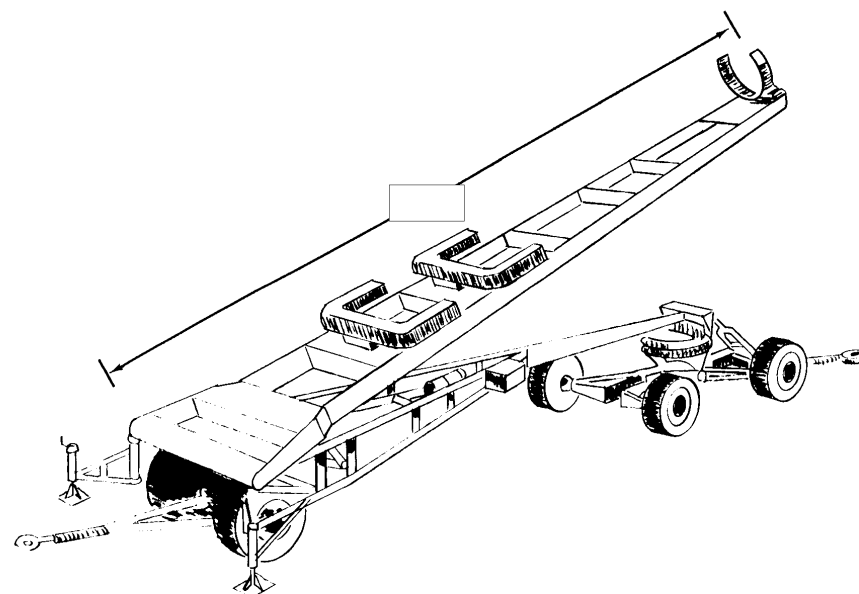
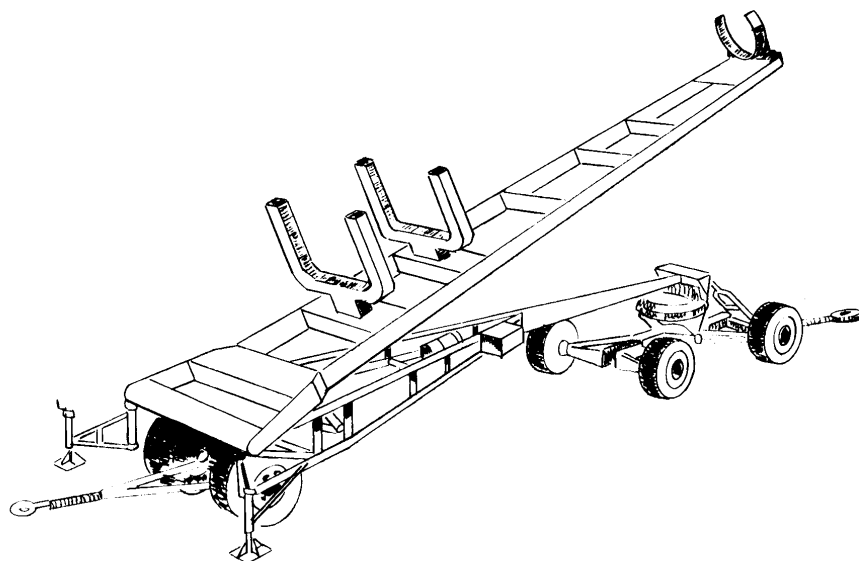
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FIGURE 5. DRAWING OF SLBM CANISTER TRANSPORTER

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FIGURE 7. DRAWING OF MODIFIED SHORT RANGE BALLISTIC MISSILE TRANSPORTER/ERECTOR

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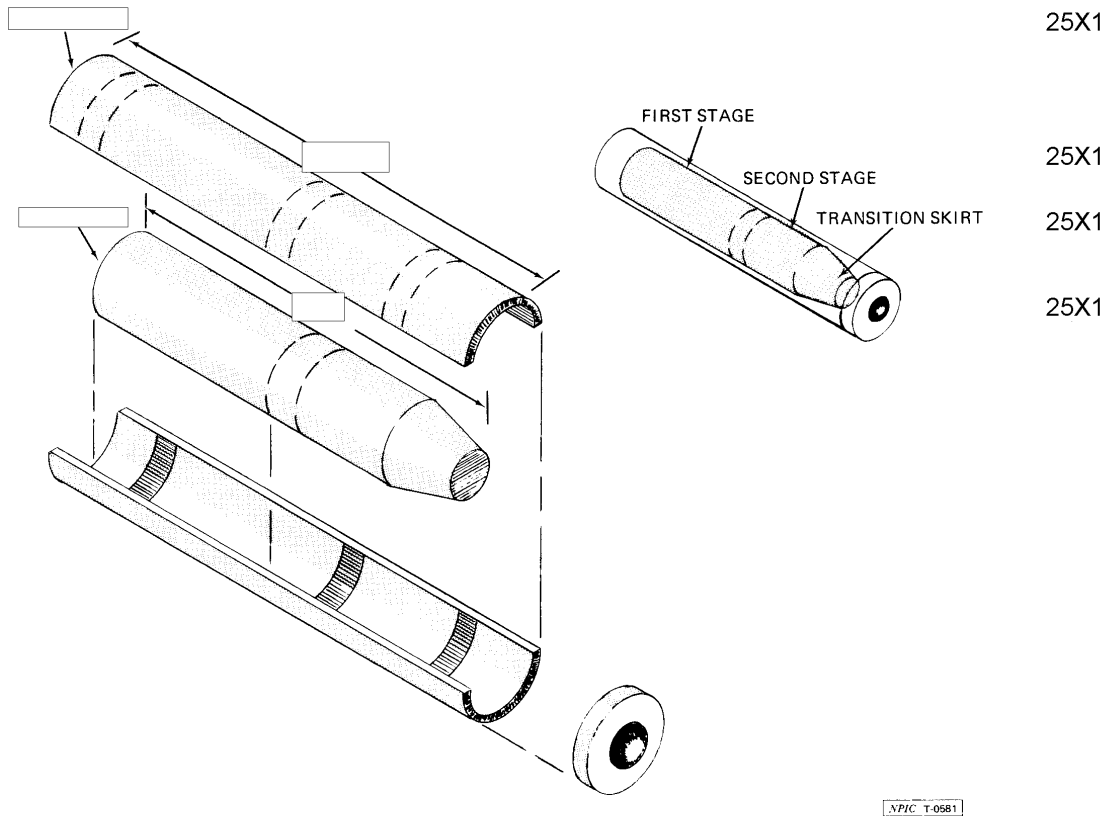


FIGURE 10. DRAWING OF MISSILE CANISTER

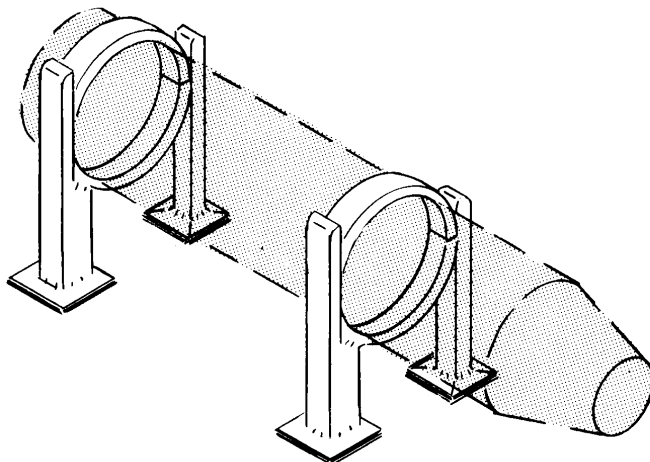


FIGURE 11. DRAWING OF MISSILE SHAPE

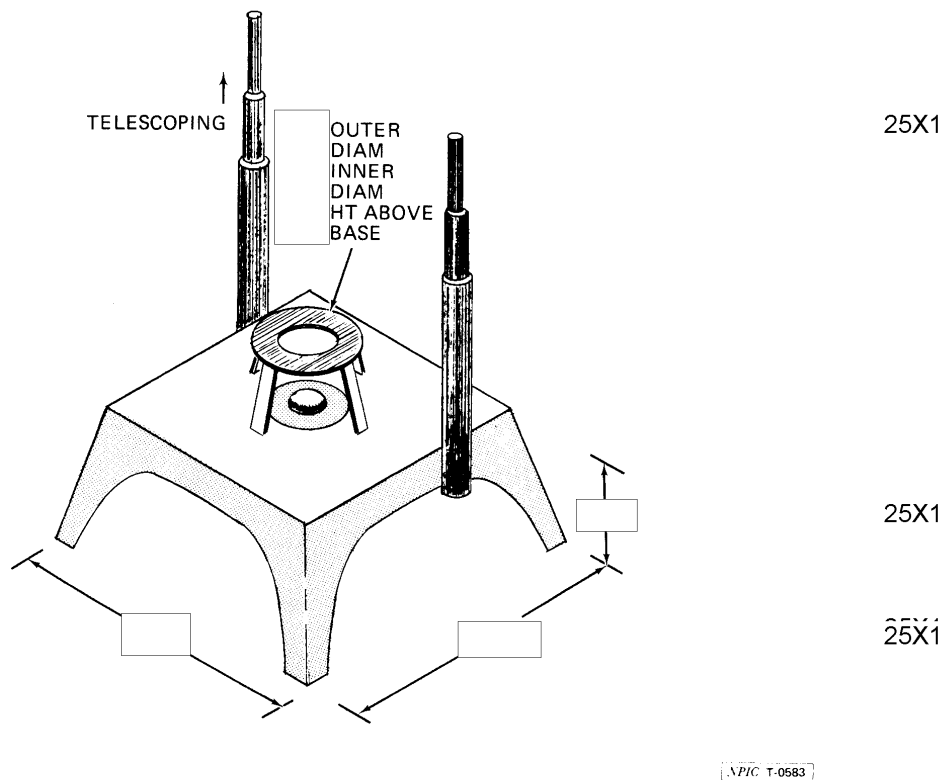


FIGURE 12. DRAWING OF LAUNCH STAND

position, adjacent to the launch stand. The WZ-1 was obscured by shadow and the T/E support/service platforms. Analysis of the shadows cast by the T/E and missile indicated that a possible payload was on the missile for the first time. A cable was visible on the launch pad, connecting the west corner of the launch stand to a drive-down revetment southeast of the erected SLBM. No canister, canister transporter, or truck-mounted cranes were at the launch site. A rectangular ground clearing was visible 100 meters west of the launch pad. No identifiable construction was observed, although a bulldozer was working in the area. On [] the WZ-1 had been removed from the launch stand. The SRBM T/E and launch stand remained on the launch pad; however, the launch stand had been moved from the middle of the launch pad to the west-northwest edge of the pad. Construction continued at the clearing west of the launch pad.

Fourth Erection Test

10. (TSR) During the period [] the fourth WZ-1 erection test was observed. On [] the WZ-1 had again been erected on the A1 pad (Figure 15). The bed of the SRBM T/E was again in the erected position, providing support to the missile. Shadow analysis indicated that a payload was on the missile. A closed missile canister was lying on the apron and more than 30 people were on or near the apron. Construction continued in the clearing area west of the pad, and a small, rectangular raised pad had been constructed in the cleared area, approximately 90 meters from the center of the pad. A peak-roofed building/tent occupied the south end of the new pad (Figure 15 inset). A small, light-toned circular area was also on the pad adjacent to the north side of the building/tent, approximately centered on the pad. This construction was possibly for a camera or telemetry position. A large lightning arrestor tower is permanently positioned at the edge of the pad between this new pad and the launch position, making it unlikely that this is a theodolite shelter. The canister transporter and the large truck-mounted crane were parked in the support facility. On [] the erection test continued at the launch pad (Figure 16). A payload was clearly visible on the erected missile. A cable was visible connecting the southeast corner of the launch stand with the southernmost drive-down revetment at the southeast edge of the launch pad. Only two to three people were in the launch pad area. At the new pad west of the launch site, the light-toned circular area was no longer observed; however, the building/tent remained. On [] the erection test appeared to be concluding (Figure 17). The erected WZ-1, including the payload, was seen from the sun lit side and appeared light toned. The building/tent had also been removed from the pad west of the launch site. The service platforms appeared to completely encircle the missile just below the payload and at the probable junction between the first and second stages. The canister trans-

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porter, with one half of the missile canister on it, was parked in the missile handling position adjacent to the large truck-mounted crane. The lifting arm of the crane was extended toward the erected missile, possibly for removal of the payload. A cargo truck, with a possible fixture in the back, was parked near the north end of the canister transporter and may have been the transporter for the payload. No cabling was visible on the launch pad. This activity probably indicated the end of the erection test and that the missile components were being handled by the large truck-mounted crane. On [] the missile had been removed from the launch site. The SRBM T/E and the launch stand remained at the launch position in the center of the A1 launch pad. The T/E support platforms were folded flat, and the T/E and launch stand were covered with light-toned canvas. None of the other SLBM support equipment was observed at either the launch site or the support facility.

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Fifth Erection Test

11. (S/D) On [] a WZ-1 erection test was again observed at the A1 launch pad (Figure 18). The WZ-1 was erected and free standing on the launch stand for the first time. A probable optical tracking stripe was visible on the body of the light-toned missile, descending from the upper left to the lower right. The payload was clearly visible for the first time. The dark-toned payload appeared to be a blunt-tipped cone attached to the tapered transition skirt on the top of the second stage of the missile body. The SRBM T/E was in the down position, and two missile support/service platforms were clearly visible on the horizontal bed of the erecting mechanism. The platforms were Y shaped, with the open section in the platforms toward the missile. No personnel or cabling was observed on the launch pad. Ten to 15 people, one bus, one van, and four small unidentified pieces of equipment were on the nearby A2 launch site apron. An additional 20 to 25 people were at the drive-down revetment that had previously been cable connected to the launch stand. The building/tent remained on the pad west of the launch site. On [] all of the SLBM equipment, including the launch stand and SRBM T/E, had been removed from the launch site. The building/tent had also been removed from the pad west of the launch site. The canvas-covered SRBM T/E was parked in the support facility; no other SLBM support equipment was observed.

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Surface Launch Test Phase

12. (S/D) The surface launch test phase will probably begin at the test center after the erection test phase has been completed at the A1 launch pad. Indications that the first surface launch test may be conducted in the near future were observed during the last erection test. The presence of an optical tracking stripe on the missile body for the first time on [] indicated that the missile may have been a live missile. Previous handling tests were probably carried out with a missile that was filled with inert materials because of safety considerations and the possibility that extensive handling tests might fracture the propellant grain. Therefore, it was unlikely that the early erection tests were made with a propellant-filled missile.

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Silo Launch Test Phase

13. (S/D) Early indicators of a resumption of test activity at the A2 launch site were observed on [] when a probable launch tube was observed in the support facility (Figures 19 and 20). The launch tube had probably been removed from the A2 launch position. The launch tube possibly would require refurbishment following the ejection test phase, or the launch tube was a replacement for the A2 launch tube in preparation for the silo launch test phase. Considerable activity has been observed on the A2 apron, probably supporting erection testing at the A1 launch pad during the period. The launch tube cover has remained closed throughout the period. The silo launch phase will probably not begin for at least three to six months, depending upon the success or failures encountered in the surface launch phase.

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Imagery Analyst's Comments

14. (S/D) Recently, the SLBM program has been progressing at a rapid pace, especially considering the long hiatus during the mid and late 1970s. The solid propellant missile developed as part of the SLBM program now rapidly approaching launch testing from both a surface pad and a launch tube mounted in a silo. All present indicators tend to support an SLBM usage of the missile. However, the WZ-1 could also function in a land-based SSM role. The missile test program, as presently observed, would also support land-based deployment as a parallel program. The largest apparent delay in the SLBM program has been in the submarine development portion of the program. The missile development program is rapidly approaching a series production capability at Hohhot Solid Propellant Complex. The production capability currently being installed at Hohhot appears to be in preparation for a greater production capability than would be required by submarine deployment alone. This may indicate that at least some of the missiles may be deployed in the land-based SSM role. If the launch test series currently in preparation at the Wuzhai Missile Test Complex is successful, the WZ-1 missile could reach an initial operational capability during 1981 or 1982. The test activities observed at Wuzhai would also support deployment of the solid propellant missile in a mobile, land-based role. In this role, the solid propellant missile would offer a short reaction time, use a relatively small quantity of support equipment, and be available for deployment within a fairly short period of time. This mobile, rapid-reaction missile system could be

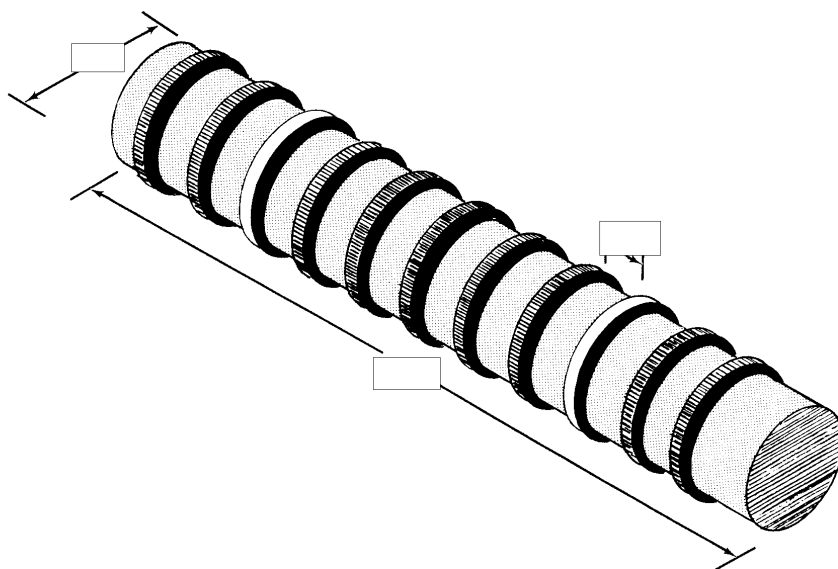
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FIGURE 20. DRAWING OF SLBM LAUNCH TUBE

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deployed as an addition to the currently active liquid propellant systems, or as a replacement for some of the older systems. The SSBN development activities will probably continue to limit the overall SLBM development program. The development of an operational SLBM force remains a high priority goal in China in the 1980s. A significantly more modern and mobile SSM capability could also be developed using the technological and developmental efforts expended in the SLBM program.

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(TSR) All applicable KEYHOLE imagery acquired between [] 25X1
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